

THERMODYNAMIC PROPERTIES

The principles of thermodynamics find wide application in correlating and predicting the properties of hydrocarbons. For example, the effect of pressure on the enthalpy of a gas can be computed from pressure-volume-temperature data. Latent heats can be computed from the slopes of vapor-pressure curves. The properties of greatest interest are specific heats of gases and liquids, heats of vaporization, and the effects of pressure on the enthalpies of compressible fluids. Enthalpy-entropy charts for natural gases

permit prediction of temperature change when expanding gases or the reversible work of compression.

Heat Capacity

The property of a fluid which denotes the heat required to raise or lower its temperature is its enthalpy H . Changes in enthalpy with changes in temperature T and pressure P for a single-phase fluid are given by the equation

$$H_2 - H_1 = \int_1^2 C_p dT + \int_1^2 \left(\frac{\partial H}{\partial P} \right)_T dP \quad (4-28)$$

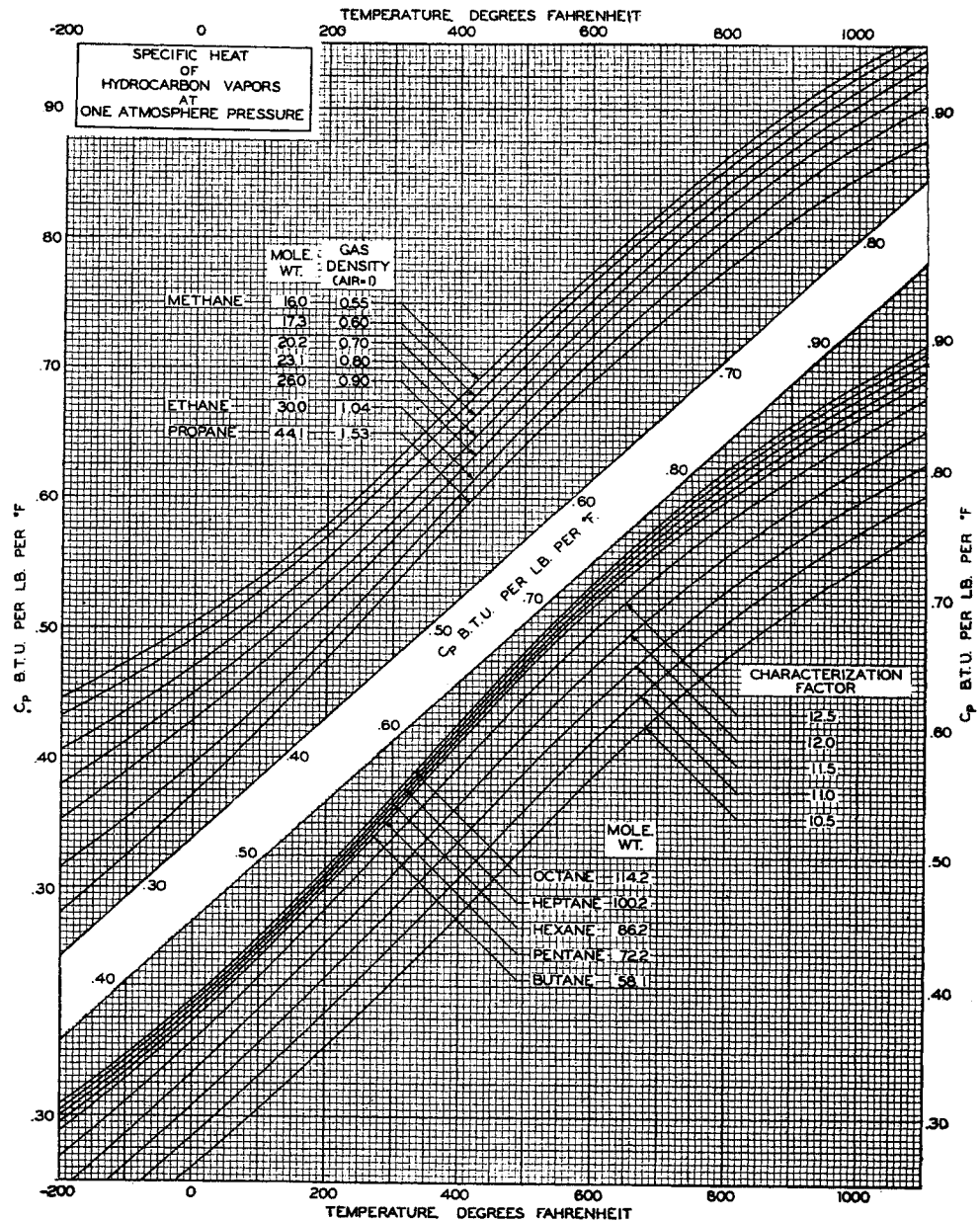


Fig. 4-49. Specific heat of hydrocarbon gases. (Brown, 4-16. Courtesy AIME.)